INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 98/00010

A. CLASSIFICATION OF SUBJECT MATTER

Int Cl[6]: A45D 8/36, A41D 20/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC A45D 8/36, A41D 20/00, A01K 27/00, A01K 13/00, A01M 1/20. C11C 5/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WPAT: (INSECT OR REPEL:) AND WAX:
JAPIO: (INSECT OR REPEL:) AND WAX:

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y Y	Derwent Abstract Accession No. 84-303057/49, Class P14 JP 59-187722 A (EARTH SEIYAKU KK) 24 November 1984	1-4, 8-9, 15-20 5, 10, 13, 21, 24 24, 25
X Y	Derwent Abstract Accession No. 84-051553/09, Class P14P32 JP 59-008956 A (EARTH SEIYAKU KK) 18 January 1984	1-4, 8-9, 15-20, 24, 25 5, 10, 13, 21, 24

[X] Further documents are listed in the continuation of Box C

[ ] See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 February 1998	25 FEB 1998

Name and mailing address of the ISA/AU
AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION
PO BOX 200
WODEN ACT 2606
AUSTRALIA Facsimile No.: (02) 6285 3929

Authorized officer

EDWARD MILLER

Telephone No.: (02) 6283 2188

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 98/00010

C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y		24, 25
Y	US 5465689 A (WINDER) 14 November 1995 column 2 line 63 - column 3 line 22	5, 10, 13, 21, 24
Y	Derwent Abstract Accession No. 97-038432/04, Class P21 JP 08-296171 A (FUKUSUKE CORP) 12 November 1996	24, 25

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference RVW : TW : 00010.D24	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International application No. **PCT/AU 98/00010**	International filing date *(day/month/year)* 9 January 1998	Priority Date *(day/month/year)* 9 January 1997
International Patent Classification (IPC) or national classification and IPC **Int. Cl.**[6] A45D 8/36; A41D 20/00		
Applicant LICE BUSTERS INTERNATIONAL PTY LTD et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of **three** sheets, including this cover sheet.

   [X] This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of **seven** sheet(s).

3. This report contains indications relating to the following items:

I	[X]	Basis of the report
II	[ ]	Priority
III	[ ]	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	[ ]	Lack of unity of invention
V	[X]	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
VI	[ ]	Certain documents cited
VII	[ ]	Certain defects in the international application
VIII	[ ]	Certain observations on the international application

Date of submission of the demand 7 August 1998	Date of completion of the report 19 January 1999
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No. (02) 6285 3929	Authorized Officer **D.R. LUM** Telephone No. (02) 6283 2544

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

national application No.
PCT/AU 98/00010

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed.

☒ the description, pages **1, 5-10,** as originally filed,
pages , filed with the demand,
pages **2-3,** filed with the letter of **24 December 1998**
page **4** filed with the letter of **23 October 1998.**

☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages **11-14,** filed with the letter of **24 December 1998.**

☐ the drawings, pages **1/2-2/2,** as originally filed,
pages , filed with the demand,
pages , filed with the letter of .

☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , filed with the letter of

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, was on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/fig

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report*

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-27	YES
	Claims		NO
Inventive step (IS)	Claims	1-27	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-27	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Claims 1-27

The invention is directed to an insect repellent substrate impregnated in a strip of fabric base material adapted to be attached to a garment in a manner which will ensure continuous contact of the substrate with the wearer. When the substrate loses its potency, it can be replaced with a fresh substrate.

None of the documents cited, individually or in obvious combination, disclose the characteristic features.

Hence the invention as defined is novel.

invention will be described primarily in relation to the treatment and prevention of lice infestation, it is to be understand that it also has application to the treatment and/or prevention of infestations of other parasitic insects such as fleas. Furthermore, although the insect repellent substrate is particularly suitable for headwear it may also have other applications such as, for example, under a pillow at night.

According to one aspect of the present invention there is provided an insect repellent substrate for repelling lice and the like insects and for attachment to a garment, the substrate comprising:

a strip of fabric base material impregnated with a repellent carrier composition and being adapted to attach to the garment in a manner that will ensure continuous contact of the insect repellent substrate with the wearer's hair or body, the carrier composition including a mixture of wax and an insect repellent whereby, in use, the wearer's body heat causes the carrier composition to soften to provide a controlled release of the insect repellent from the fabric base material.

Preferably the insect repellent is a naturally occurring compound. More preferably the insect repellent includes an extract from the pyrethrum flower. Most preferably the insect repellent is pyrethrum oil. Advantageously the carrier composition further includes one or more scented or aromatic oils. More preferably the carrier composition includes citronella oil and rosemary oil, which are also mild insect repellents. Preferably the carrier composition further includes neem oil, a naturally occurring insect repellent.

Typically the wax is a paraffin wax. Alternatively, the wax is beeswax obtained from honeycomb of the bee.

Preferably the carrier composition includes between 0.5% to 6.0% by volume of pyrethrum. Preferably the carrier composition includes between 0.5% to 4.0% citronella oil. Preferably the carrier composition includes between 0.5% to 5.0% rosemary oil. Preferably the carrier composition includes between 3.0% to 9.0% neem oil. Preferably the carrier composition also includes between 0.5% to 6.0% eucalyptus oil.

Most preferably the carrier composition includes 30 mls of pyrethrum (50% w/w), 20 mls of citronella, 25 mls of rosemary and 45 mls of neem oil to every one litre of wax. Preferably the fabric base material is a felt material; most preferably a polyester/cotton blend felt material.

According to another aspect of the present invention there is provided a method of manufacturing an insect repellent substrate for repelling lice and the like insects for attachment to a garment, the method comprising the steps of:

producing a repellent carrier composition by:

heating a wax to a liquid state; and,

mixing an insect repellent with the liquid wax;

dipping a strip of fabric base material into the carrier composition whilst still in the liquid state for a sufficient length of time to allow the base material to absorb some of the carrier composition;

allowing the impregnated strip of base material to cool so that the carrier composition solidifies on the base

material to form said insect repellent substrate; and,

attaching the substrate to the garment whereby, in use, the wearer's body heat causes the carrier composition to soften to provide a controlled release of the insect repellent from the fabric base material.

Preferably the insect repellent is a naturally occurring compound. More preferably the insect repellent includes an extract of the pyrethrum flower. Most preferably the insect repellent includes pyrethrum oil.

Preferably the step of producing the repellent carrier composition further includes mixing one or more scented or aromatic oils with the liquid wax. Most preferably the scented oils include citronella oil and rosemary oil, which are also mild insect repellents.

Preferably the step of producing the carrier composition further includes mixing neem oil with the liquid wax.

Typically the garment is an item of headwear such as, for example, a headband, hat or a cap. Alternatively the garment is an animal garment, such as, for example, a flea collar or a coat.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to facilitate a better understanding of the nature of the invention a preferred embodiment of the insect repellent substrate will now be described in detail, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 illustrates a typical piece of insect repellent substrate in accordance with the invention;

THE CLAIMS DEFINING THE PRESENT INVENTION ARE AS FOLLOWS:

1. An insect repellent substrate for repelling lice and the like insects and for attachment to a garment, the substrate comprising:

a strip of fabric base material impregnated with a repellent carrier composition and being adapted to attach to the garment in a manner that will ensure continuous contact of the insect repellent substrate with the wearer's hair or body, the carrier composition including a mixture of wax and an insect repellent whereby, in use, the wearer's body heat causes the carrier composition to soften to provide a controlled release of the insect repellent from the fabric base material.

2. An insect repellent substrate as defined in claim 1, wherein the insect repellent is a naturally occurring compound.

3. An insect repellent substrate as defined in claim 2, wherein the insect repellent includes an extract from the pyrethrum flower.

4. An insect repellent substrate as defined in claim 3, wherein the insect repellent is a pyrethrum solution.

5. An insect repellent substrate as defined in claim 1, wherein the carrier composition further includes one or more scented or aromatic oils.

6. An insect repellent substrate as defined in claim 5, wherein the carrier composition includes citronella oil and rosemary oil, which are also mild insect repellents.

7. An insect repellent substrate as defined in claim 2, wherein the carrier composition further includes neem oil,

a naturally occurring insect repellent.

8. An insect repellent substrate as defined in claim 1, wherein the wax is a paraffin wax.

9. An insect repellent substrate as defined in claim 4, wherein the carrier composition includes between 0.5% to 6.0% by volume of pyrethrum.

10. An insect repellent substrate as defined in claim 9, wherein the carrier composition includes between 0.5% to 4.0% citronella oil.

11. An insect repellent substrate as defined in claim 10, wherein the carrier composition includes between 0.5% to 5.0% rosemary oil.

12. An insect repellent substrate as defined in claim 11, wherein the carrier composition includes between 3.0% to 9.0% neem oil.

13. An insect repellent substrate as defined in claim 12, wherein the carrier composition also includes between 0.5% to 6.0% eucalyptus oil.

14. An insect repellent substrate as defined in claim 13, wherein the carrier composition includes 30 mls of pyrethrum (50% w/w), 20 mls of citronella, 25 mls of rosemary and 45 mls of neem oil to every one litre of wax.

15. An insect repellent substrate as defined in claim 1, wherein the fabric base material is a felt material.

16. An insect repellent substrate as defined in claim 15, wherein the fabric base material is a polyester/cotton blend felt material.

17. A method of manufacturing an insect repellent substrate for repelling lice and the like insects for attachment to a garment, the method comprising the steps of:

producing a repellent carrier composition by:

heating a wax to a liquid state; and,

mixing an insect repellent with the liquid wax;

dipping a strip of fabric base material into the carrier composition whilst still in the liquid state for a sufficient length of time to allow the base material to absorb some of the carrier composition;

allowing the impregnated strip of base material to cool so that the carrier composition solidifies on the base material to form said insect repellent substrate; and,

attaching the substrate to the garment in a manner that will ensure continuous contact of the insect repellent substrate with the wearer's hair or body whereby, in use, the wearer's body heat causes the carrier composition to soften to provide a controlled release of the insect repellent from the fabric base material.

18. A method of manufacturing an insect repellent substrate as defined in claim 17, wherein the insect repellent is a naturally occurring compound.

19. A method of manufacturing an insect repellent substrate as defined in claim 18, wherein the insect repellent includes an extract of the pyrethrum flower.

20. A method of manufacturing an insect repellent substrate as defined in claim 19, wherein the insect repellent includes a pyrethrum solution.

21. A method of manufacturing an insect repellent substrate as defined in claim 17, wherein the step of producing the repellent carrier composition further includes mixing one or more scented or aromatic oils with the liquid wax.

22. A method of manufacturing an insect repellent substrate as defined in claim 21, wherein the scented oils include citronella oil and rosemary oil, which are also mild insect repellents.

23. A method of manufacturing an insect repellent substrate as defined in claim 17, wherein the step of producing the carrier composition further includes mixing neem oil with the liquid wax.

24. An insect repellent substrate as defined in claim 1, wherein the garment is an item of headwear.

25. An insect repellent substrate as defined in claim 24, wherein the garment is a headband and said insect repellent substrate is sewn onto the inside of a stretch fabric forming the headband.

26. An insect repellent substrate as defined in claim 1, wherein the insect repellent substrate is removably attached to the garment using hook and loop fastening material.

27. An insect repellent substrate as defined in claim 26, wherein the garment is a baseball cap.

PATENT COOPERATION TREATY CORRECTED VERSION

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference RVW : TW : 00010.D24	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International application No. **PCT/AU 98/00010**	International filing date *(day/month/year)* 9 January 1998	Priority Date *(day/month/year)* 9 January 1997
International Patent Classification (IPC) or national classification and IPC **Int. Cl.**[6] A45D 8/36; A41D 20/00		
Applicant ROBINSON, Veronica		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of **three** sheets, including this cover sheet.

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   These annexes consist of a total of **seven** sheet(s).

3. This report contains indications relating to the following items:

I	[X]	Basis of the report
II	[ ]	Priority
III	[ ]	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	[ ]	Lack of unity of invention
V	[X]	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
VI	[ ]	Certain documents cited
VII	[ ]	Certain defects in the international application
VIII	[ ]	Certain observations on the international application

Date of submission of the demand	Date of completion of the report
7 August 1998	19 January 1999
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No. (02) 6285 3929	Authorized Officer **D.R. LUM** Telephone No. (02) 6283 2544

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/AU 98/00010

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed.

☒ the description, pages **1, 5-10,** as originally filed,
pages , filed with the demand,
pages **2-3,** filed with the letter of **24 December 1998**
page **4** filed with the letter of **23 October 1998.**

☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages **11-14,** filed with the letter of **24 December 1998.**

☐ the drawings, pages **1/2-2/2,** as originally filed,
pages , filed with the demand,
pages , filed with the letter of .

☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , filed with the letter of

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, was on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:
☐ the description, pages
☐ the claims, Nos.
☐ the drawings, sheets/fig

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report*

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-27	YES
	Claims		NO
Inventive step (IS)	Claims	1-27	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-27	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Claims 1-27

The invention is directed to an insect repellent substrate impregnated in a strip of fabric base material adapted to be attached to a garment in a manner which will ensure continuous contact of the substrate with the wearer. When the substrate loses its potency, it can be replaced with a fresh substrate.

None of the documents cited, individually or in obvious combination, disclose the characteristic features.

Hence the invention as defined is novel.

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and Administrative Instructions, Section 422)

To:

VAN WOLLINGEN, Rolf
Griffith Hack
256 Adelaide Terrace
Perth, W.A. 6000
AUSTRALIE

Date of mailing (day/month/year)
07 December 1998 (07.12.98)

Applicant's or agent's file reference
LICE:BUSTERS

IMPORTANT NOTIFICATION

International application No.
PCT/AU98/00010

International filing date (day/month/year)
09 January 1998 (09.01.98)

1. The following indications appeared on record concerning:

[X] the applicant [ ] the inventor [ ] the agent [ ] the common representative

Name and Address
LICE BUSTERS INTERNATIONAL PTY LTD
Unit 4
77 Howe Street
Osborne Park, W.A. 6017
Australia

State of Nationality: AU
State of Residence: AU
Telephone No.:
Facsimile No.:
Teleprinter No.:

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

[ ] the person [ ] the name [ ] the address [ ] the nationality [ ] the residence

Name and Address
ROBINSON, Veronica
14 Parakeela Grove
Maddington, W.A. 6109
Australia

State of Nationality: GB
State of Residence: AU
Telephone No.:
Facsimile No.:
Teleprinter No.:

3. Further observations, if necessary:
The applicant indicated in Box 1 has assigned his rights to the applicant/inventor ROBINSON, Veronica.

4. A copy of this notification has been sent to:

[X] the receiving Office
[ ] the International Searching Authority
[X] the International Preliminary Examining Authority
[ ] the designated Offices concerned
[X] the elected Offices concerned
[ ] other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

Authorized officer
Mougamadou Abidine
Telephone No.: (41-22) 338.83.38

invention will be described primarily in relation to the treatment and prevention of lice infestation, it is to be understand that it also has application to the treatment and/or prevention of infestations of other parasitic insects such as fleas. Furthermore, although the insect repellent substrate is particularly suitable for headwear it may also have applications such as, for example, under a pillow at night.

According to one aspect of the present invention there is provided an insect repellent substrate for repelling lice and the like insects, the substrate comprising:

a piece of fabric base material impregnated with a repellent carrier composition, the carrier composition including a mixture of wax and an insect repellent whereby, in use, the carrier composition provides a controlled release of the insect repellent from the fabric base material.

Preferably the insect repellent is a naturally occurring compound. More preferably the insect repellent includes an extract from the pyrethrum flower. Most preferably the insect repellent is pyrethrum oil. Advantageously the carrier composition further includes one or more scented or aromatic oils. More preferably the carrier composition includes citronella oil and rosemary oil, which are also mild insect repellents. Preferably the carrier composition further includes neem oil, a naturally occurring insect repellent.

Typically the wax is a paraffin wax. Alternatively, the wax is beeswax obtained from honeycomb of the bee.

Preferably the carrier composition includes between 0.5% to 6.0% by volume of pyrethrum. Preferably the carrier composition includes between 0.5% to 4.0% citronella oil. Preferably the carrier composition includes between 0.5% to

5.0% rosemary oil. Preferably the carrier composition includes between 3.0% to 9.0% neem oil. Preferably the carrier composition also includes between 0.5% to 6.0% eucalyptus oil.

Most preferably the carrier composition includes 30 mls of pyrethrum (50% w/w), 20 mls of citronella, 25 mls of rosemary and 45 mls of neem oil to every one litre of wax. Preferably the fabric base material is a felt material; most preferably a polyester/cotton blend felt material.

According to another aspect of the present invention there is provided a method of manufacturing an insect repellent substrate for repelling lice and the like insects, the method comprising the steps of:

producing a repellent carrier composition by:

heating a wax to a liquid state; and,

mixing an insect repellent with the liquid wax;

dipping a piece of fabric base material into the carrier composition whilst still in the liquid state for a sufficient length of time to allow the base material to absorb some of the carrier composition; and,

allowing the impregnated piece of base material to cool so that the carrier composition solidifies on the base material whereby, in use, the carrier composition provides a controlled release of the insect repellent from the fabric base material.

Preferably the insect repellent is a naturally occurring compound. More preferably the insect repellent includes an extract of the pyrethrum flower. Most preferably the insect repellent includes pyrethrum oil.

Preferably the step of producing the repellent carrier composition further includes mixing one or more scented or aromatic oils with the liquid wax. Most preferably the scented oils include citronella oil and rosemary oil, which are also mild insect repellents.

Preferably the step of producing the carrier composition further includes mixing neem oil with the liquid wax.

According to a still further aspect of the present invention there is provided a garment having an insect repellent substrate for repelling lice and the like insects provided in connection therewith, the garment comprising:

a piece of fabric base material impregnated with a repellent carrier composition and attached to the garment in a manner that will ensure contact with the wearer's hair or body, the carrier composition including a mixture of wax and an insect repellent whereby, in use, the carrier composition provides a controlled release of the insect repellent from the fabric base material.

Typically the garment is an item of headwear such as, for example, a headband, hat or a cap. Alternatively the garment is an animal garment, such as, for example, a flea collar or a coat.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to facilitate a better understanding of the nature of the invention a preferred embodiment of the insect repellent substrate will now be described in detail, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 illustrates a typical piece of insect repellent substrate in accordance with the invention;

THE CLAIMS DEFINING THE PRESENT INVENTION ARE AS FOLLOWS:

1. An insect repellent substrate for repelling lice and the like insects, the substrate comprising:

a piece of fabric base material impregnated with a repellent carrier composition, the carrier composition including a mixture of wax and an insect repellent whereby, in use, the carrier composition provides a controlled release of the insect repellent from the fabric base material.

2. An insect repellent substrate as defined in claim 1, wherein the insect repellent is a naturally occurring compound.

3. An insect repellent substrate as defined in claim 2, wherein the insect repellent includes an extract from the pyrethrum flower.

4. An insect repellent substrate as defined in claim 3, wherein the insect repellent is a pyrethrum solution.

5. An insect repellent substrate as defined in claim 1, wherein the carrier composition further includes one or more scented or aromatic oils.

6. An insect repellent substrate as defined in claim 5, wherein the carrier composition includes citronella oil and rosemary oil, which are also mild insect repellents.

7. An insect repellent substrate as defined in claim 2, wherein the carrier composition further includes neem oil, a naturally occurring insect repellent.

8. An insect repellent substrate as defined in claim 1, wherein the wax is a paraffin wax.

9. An insect repellent substrate as defined in claim 4, wherein the carrier composition includes between 0.5% to 6.0% by volume of pyrethrum.

10. An insect repellent substrate as defined in claim 9, wherein the carrier composition includes between 0.5% to 4.0% citronella oil.

11. An insect repellent substrate as defined in claim 10, wherein the carrier composition includes between 0.5% to 5.0% rosemary oil.

12. An insect repellent substrate as defined in claim 11, wherein the carrier composition includes between 3.0% to 9.0% neem oil.

13. An insect repellent substrate as defined in claim 12, wherein the carrier composition also includes between 0.5% to 6.0% eucalyptus oil.

14. An insect repellent substrate as defined in claim 13, wherein the carrier composition includes 30 mls of pyrethrum (50% w/w), 20 mls of citronella, 25 mls of rosemary and 45 mls of neem oil to every one litre of wax.

15. An insect repellent substrate as defined in claim 1, wherein the fabric base material is a felt material.

16. An insect repellent substrate as defined in claim 15, wherein the fabric base material is a polyester/cotton blend felt material.

17. A method of manufacturing an insect repellent substrate for repelling lice and the like insects, the method comprising the steps of:

producing a repellent carrier composition by:

heating a wax to a liquid state; and,
mixing an insect repellent with the liquid wax;

dipping a piece of fabric base material into the carrier composition whilst still in the liquid state for a sufficient length of time to allow the base material to absorb some of the carrier composition; and,

allowing the impregnated piece of base material to cool so that the carrier composition solidifies on the base material whereby, in use, the carrier composition provides a controlled release of the insect repellent from the fabric base material.

18. A method of manufacturing an insect repellent substrate as defined in claim 17, wherein the insect repellent is a naturally occurring compound.

19. A method of manufacturing an insect repellent substrate as defined in claim 18, wherein the insect repellent includes an extract of the pyrethrum flower.

20. A method of manufacturing an insect repellent substrate as defined in claim 19, wherein the insect repellent includes a pyrethrum solution.

21. A method of manufacturing an insect repellent substrate as defined in claim 17, wherein the step of producing the repellent carrier composition further includes mixing one or more scented or aromatic oils with the liquid wax.

22. A method of manufacturing an insect repellent substrate as defined in claim 21, wherein the scented oils include citronella oil and rosemary oil, which are also mild insect repellents.

23. A method of manufacturing an insect repellent substrate as defined in claim 17, wherein the step of producing the carrier composition further includes mixing neem oil with the liquid wax.

24. A garment having an insect repellent substrate for repelling lice and the like insects provided in connection therewith, the garment comprising:

a piece of fabric base material impregnated with a repellent carrier composition and attached to the garment in a manner that will ensure contact with the wearer's hair or body, the carrier composition including a mixture of wax and an insect repellent whereby, in use, the carrier composition provides a controlled release of the insect repellent from the fabric base material.

25. A garment having an insect repellent substrate as defined in claim 24, wherein the garment is an item of headwear.